

REMARKS

Applicants request reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks.

Claims 1-23 are pending in this application, with Claims 1, 4, 8, 11, 17, and 20 being independent. Claims 1, 3-18, and 20-23 have been amended. No new matter is believed to have been added.

Applicants respectfully traverse the assertion that the term “means” in certain claims indicates “process”. Applicants submit that, if the claims are read as invoking 35 U.S.C. § 112, sixth paragraph, it is clear based on the disclosure in the application that one skilled in the art can readily identify what structure can perform the functions recited in certain claim features. MPEP 2181.

U.S. Patent Application No. 09/301,669, along with two other documents, was cited and submitted with the Information Disclosure Statement of March 29, 2001. Applicants enclose a copy of a postcard bearing a dated stamp of the U.S. Patent and Trademark Office, and that lists the IDS, the accompanying Form PTO-1449, and three documents. Application No. 09/301,669 has issued as U.S. Patent No. 6,333,794 B2, and a copy of the patent (and a Form PTO-1449 listing the patent) is enclosed for the Examiner’s convenience. Applicants respectfully request that the Examiner consider the patent and indicate in the next official communication that the patent has been considered.

Fig. 7 was objected to for containing the reference sign “S602” without discussion in the specification. Applicants have herein amended the specification in response. Reconsideration and withdrawal of the objection to the drawings are respectfully requested.

Fig. 6 has been amended to correct a typographical error.

The specification has been objected to as failing to provide proper antecedent basis for the claimed subject matter. Claims 6 and 13 have been amended in response.

Reconsideration and withdrawal of the objection to the specification are respectfully requested.

The title of the invention has been objected to as not being descriptive. The title of the invention has been amended herein, and reconsideration and withdrawal of the objection thereto are requested.

Claim 17 has been objected to as containing a misspelling. This claim has been amended in response. Reconsideration and withdrawal of the objection thereto are requested.

Claims 4-5 and 11-12 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 4 and 11 have been rewritten in independent form and include most of the limitations of the base claims 1 and 8, respectively. Applicants submit that Claims 4 and 11 patentably define the invention over the cited art.

Claims 1, 6, 8, 13, 15, 17, 18, 20, 21, and 23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,000,024 A ("Maddox") in view of U.S. Patent No. 5,812,975 ("Komori '975"), and further in view of U.S. Patent No. 5,787,396 ("Komori '396"). Claims 2 and 9 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Maddox in view of Komori '975, further in view of Komori '396, and further in view of the paper "Connected Sentence Recognition Using Diphone-Like Templates" ("Rosenberg"). Claims 3 and 10 have been rejected under 35 U.S.C. §103(a) as being

unpatentable over Maddox in view of Komori '975, further in view of Komori '396, and further in view of U.S. Patent No. 5,311,429 A ("Tominaga"). Claims 7 and 14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Maddox in view of Komori '975, further in view of Komori '396, and further in view of U.S. Patent No. 5,926,784 A ("Richardson"). Claim 16 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Maddox in view of Komori '975, in view of Komori '396, in view of Tominaga, and further in view of U.S. Patent No. 5,845,047 A ("Fukada") and further in view of U.S. Patent No. 5,913,193 A ("Huang"). Claims 19 and 22 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Maddox in view of Komori '975, in view of Komori '396, and further in view of Huang. These rejections are respectfully traversed.

Independent Claim 1 of the present invention, as amended, recites a speech signal processing apparatus including speech segment search means for searching a speech database for speech segments that satisfy a phonetic environment; HMM learning means for computing HMMs of phonemes on the basis of a search result of the speech segment search means; segment recognition means for performing segment recognition of the speech segments on the basis of the HMMs of the phonemes; and registration segment means for determining a speech segment used in the computation of the HMMs by the HMM learning means and registering the speech segment in a segment dictionary in accordance with a segment recognition result of the segment recognition means. Independent Claim 8 is a corresponding method claim.

Independent Claim 17, as amended, recites a speech signal processing apparatus including HMM learning means for learning HMMs corresponding to phonemes using a plurality of speech segments that satisfy a predetermined phonetic environment; and

registration segment means for selecting a speech segment used in the learning of the HMMs by the HMM learning means and registering the speech segment in a segment dictionary used in speech synthesis on the basis of the HMMs corresponding to the phonemes. Independent Claim 20 is a corresponding method claim.

According to the present invention, HMMs corresponding to respective phonemes can be learned (computed) by using a plurality of speech segments that satisfy a predetermined phonetic environment, and all speech segments used in the learning (computation) of HMMs can undergo segment recognition using the learned HMMs. Only a speech segment used in the learning of HMMs can be stored into the segment dictionary. Accordingly, the segment dictionary can exclude speech segments including allophone and noise, and suppress deterioration of the sound quality of synthetic speech.

As noted in the Office Action, the primary reference to Maddox is silent as to the use of HMM. The secondary reference Komori '396 is said to teach checking if one speech segment is a speech segment used in learning of a maximum likelihood HMM, and selecting the one speech segment when the one speech segment is a speech segment used in the learning of the maximum likelihood HMM.

Komori '396 discloses a speech recognition system which determines voice parameters from an input voice and determines an output probability by comparing the voice parameters with HMMs which are used as dictionary data for speech recognition. Rough HMMs used for estimating how much a phoneme will contribute to the recognition of the input voice are stored into a storing portion 105, and detailed HMMs for calculating the precise output probability are stored into a storing portion 106 (column 4, lines 15-31).

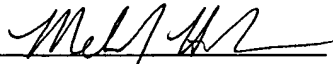
Applicants submit that, while Komori '396 may disclose storing HMMs used for estimating how much a phoneme contributes to the recognition of the input voice, it at least does not teach or suggest determining (selecting) a speech segment used in the computation (learning) of HMMs of phonemes by (in a) HMM learning means (step), or registering the determined speech segment in a segment dictionary. Nor does Komori '975 or any of the other references, taken alone or in any of the proposed combinations, teach or suggest at least these features.

Accordingly, Applicants submit that the independent claims patentably define the invention over the cited art. Reconsideration and withdrawal of the § 103 rejections are requested. The dependent claims should also be allowable for the same reasons that the base claims from which they depend are allowable, and further due to the additional features that they recite. Individual consideration of each dependent claim is respectfully requested.

Applicants submit that the application is in condition for allowance. Favorable consideration of the claims and passage to issue of the application at the Examiner's earliest convenience are requested.

Applicants' undersigned attorney may be reached in Washington, D.C. by telephone at (202) 530-1010. All correspondence should continue to be directed to the below-listed address.

Respectfully submitted,



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